

Seeding

Description

Seeding is the establishment of a temporary or permanent vegetative cover by planting seed. For the purposes of this BMP, "grass" and "turf" will be used interchangeably.

This BMP does not address planting individual sprigs of grasses or other vegetation. See the Trees, Shrubs, and Ground Covers BMP for information on planting sprigs.

Other Terms Used to Describe

Hydroseeding
Vegetative Cover

Pollutants Controlled and Impacts

Once established, turf helps keep soil on site, absorbs nutrients, and allows groundwater recharge.

Application

Land Use

This BMP is applicable to all land uses.

Soil/Topography/Climate

Vegetative establishment is important on all exposed areas, but particularly on sloping terrain and areas adjacent to waterbodies or wetlands. It is also important in areas which frequently flood or which are impacted by spring runoff or strong winds.

When to Apply

Seed should be applied immediately after grading and preparation of the seed bed is finished on each small segment of a construction project. Mulch and/or soil erosion control blankets should be used to keep seed in place until the vegetation is established.

Where to Apply

Apply on all construction or earth change sites which require temporary or permanent vegetative stabilization.

Relationship With Other BMPs

Seeding can be used in conjunction with almost all temporary and permanent soil erosion and sedimentation control measures. Any fertilizer or lime that is applied should be done based on the results of soil tests. See the Soil Management BMP. Mulching should be used in conjunction with seeding to ensure establishment of an effective vegetative cover.

Proper grading is needed to ensure the seed bed is adequate for seed application. See the "Site Preparation" section, below.

Specifications

Planning Considerations:

1. The proper **species** of seed should be selected following basic integrated pest management practices (see the Pesticide Management BMP). To reduce the amount of fertilizer, pesticides and other inputs needed, choose adapted varieties based on environmental conditions, management level desired, and the intended use. Consider mixes because they are more adaptable than single species.
2. The proper **time to seed** is dependent upon the climate of the area. In Michigan, there are three different climatic areas which determine when seeding should occur. These are included in Exhibits 1 and 2.

Seeding dates for permanent cover and dormant seeding are given in Exhibit 1. Dormant seeding is done after the normal growing season, using seed which will lay dormant in the winter but start growing as soon as soil conditions are favorable. Note that perennial grasses should be used for all permanent cover.

To determine seeding dates for temporary cover use Exhibit 2. Note that the seeds listed here are annual grasses. Be sure to use annual grasses for all temporary cover. Seed mixtures for temporary seeding usually consist of rye or wheat. These species grow better after over-wintering (via a process called vernalization).

3. **Seeding mixture for permanent cover.** For permanent cover, the appropriate seeding mixture is determined in a two-step process. First, consult Exhibit 3, which lists various land uses and site conditions. Determine conditions at your site and use the table to come up with an appropriate seeding mixture number. Exhibits 4 and 5 indicate the various species and seeding rates associated with the selected seeding mixture number on a pound per acre and 1,000 square foot basis, respectively.

Seeding mixtures for dormant seedings. Use Exhibits 3, 4, and 5 to determine proper seeding mixtures. Dormant seedings are completed in the late fall after the soil temperature remains consistently below 50°F. Perennial grasses are to be used with all dormant seedings.

Seeding mixtures for temporary cover. Temporary vegetative cover is provided to protect Spoil Piles and larger areas which are staged. Seeding mixtures for temporary vegetative cover are given in Exhibit 2.

4. Subsurface Drains may be needed where water movement may cause seeps or soil slippage. Wet waterways should be tiled to ensure the vegetation is established.
5. Note: Some wildflower seed packages contain seeds of plant species which will compete with native plants. For example, some packages contain purple loosestrife, which is detrimental to cattail populations. The Department therefore does not recommend wildflower plantings unless the seed can be certified as being native to Michigan and is appropriate to the soil and other site conditions.

Site Preparation:

1. Consider protecting seeded areas from pedestrian access using the Construction Barriers BMP.
2. Where possible, divert concentrated flows away from the seeded area at least until the vegetation is established. Follow specifications in the Diversions BMP.
3. Soil tests should be done to determine the nutrient and pH content of the soil. Depending on the results of soil tests, Soil Management may be necessary to adjust the pH to between 6.5 and 7.0 (for most conditions). All lime, fertilizer and other soil amendments should be addressed following the Soil Management specifications. Note that sandy loam, loam, and silt loam are the preferred soils for seeding. Consideration should be given to incorporating these soils into the seedbed.
4. Prepare a 3-5-inch deep seedbed, with the top 3-4 inches consisting of topsoil. Note that the earth bed upon which the topsoil is to be placed should be at the required grade.
5. The seedbed should be firm but not compact. The top three inches of soil should be loose, moist and free of large clods and stones. For most applications, all stones larger than 2 inches in diameter, roots, litter and any foreign matter should be raked and removed. The topsoil surface should be in reasonably close conformity to the lines, grades and cross sections shown on the grading plans.
6. Slopes steeper than 3:1 should be roughened.

Planting:

1. Seed should be applied as soon after seedbed preparation as possible, when the soil is loose and moist. If the seedbed has been idle long enough for the soil to become compact, the topsoil should be harrowed with a disk, a spring tooth drag, a spike tooth drag, or other equipment designed to condition the soil for seeding. Harrowing should be done horizontally across the face of the slope.
2. Always apply seed before mulch.
3. Apply seed at the rates specified in the attached Exhibits using calibrated spreaders, cyclone seeders, mechanical drills, or hydroseeders.
4. Ideally, broadcast seed should be incorporated into the soil by raking or chain dragging, or otherwise floated, then lightly compacted to provide good seed-soil contact.
5. For hydroseeding operations:
 - Seed should be applied at recommended rates. If no rates are given, use 150-200 lbs/acre.
 - Use 2 tons/acre straw mulch, unless otherwise recommended. Use 3 tons/acre when dormant.

- If recycled newsprint is used, follow specifications in the Mulching BMP.
- 6. All newly seeded areas should be protected from erosive forces by mulch. See the Mulching BMP.
- 7. Species of grasses which cannot be planted with seed should be planted by sprigging or sodding. See the Trees, Shrubs and Ground Covers BMP for information on sprigging, and the Sodding BMP for information on sodding.
- 8. Excess topsoil should be disposed of following specifications in the Spoil Piles BMP.

Maintenance

Newly seeded areas need to be inspected frequently for the first few months to ensure the grass is growing. If the seeded area is damaged due to runoff, additional stormwater measures may be needed. Spot Seeding can be done on small areas to fill in bare spots where grass didn't grow properly.

Once the vegetation is well established:

1. Construction Barriers may be removed.
2. Water the grass following specifications in the Lawn Maintenance BMP.
3. If the grass is to be mowed, keep it to a height appropriate for the species selected and the intended use. Follow mowing specifications in the Lawn Maintenance BMP.
4. Occasional soil tests should be collected and analyzed to determine if the soil is appropriately fertilized. Follow the procedures in the Soil Management BMP.
5. Control pests following specifications in the Pesticide Management BMP.
6. Refer to the Lawn Maintenance BMP for determining the steps which can be taken to improve unhealthy turf.

Exhibits

- Exhibit 1: Seeding Dates for Permanent Cover. Modified from the Soil Conservation Service Technical Guide, #342.
- Exhibit 2: Seeding Dates for Temporary Vegetation. USDA Soil Conservation Service Technical Guide, #342.
- Exhibit 3: Determining the Appropriate Seed Mixture. Extracted from USDA Soil Conservation Service Technical Guide, #342.

Exhibit 4: Seeding Mixture (in pounds/acre). Extracted from USDA Soil Conservation Service Technical Guide, #342.

Exhibit 5: Seeding Mixture (in pounds/1,000 ft²). Extracted from USDA Soil Conservation Service Technical Guide, #342.

Exhibit 1

Seeding Dates for Permanent Cover

<u>Zones</u>	Normal Seeding <u>Dates</u>	Dormant* Seeding <u>Dates</u>
Lower Peninsula, South of U.S. 10	May 1 to October 10	Nov. 1 to freeze up
Lower Peninsula, North of U.S. 10	May 1 to October 1	Oct. 25 to freeze up
Upper Peninsula, entire area	May 1 to Sept. 20	Oct. 20 to freeze up

* Dormant seeding may be done in the late fall after the soil temperature remains consistently below 50°F. This is appropriate if construction on a site is completed in the fall but seed was not planted prior to Normal Seeding Dates. Since the initial temperature for seed germination is approximately 50 degrees F (soil temperature), this practice intends germination will not occur until spring. Extra cereal rye, a cool season annual grass, may be added to attempt to get some fall growth.

- Mulching must be used on any dormant seed. This is particularly important on erosive sites.
- Do not seed when the ground is frozen or snow covered.
- Do not use a dormant seeding on Grassed Waterways.

Source: Modified from USDA Soil Conservation Service Technical Guide.

Exhibit 2

Seeding Dates for Temporary Vegetation Cover

Planting Zones:

1. Lower Peninsula, South of US 10.
2. Lower Peninsula, North of US 10.
3. Upper Peninsula.

Zone			Kind of Seed	Amount	
1	2	3		Per 1,000 Sq. Feet	Per Acre
Apr. 1 to Sept. 15	Apr. 15 to Aug. 1	May 1 to Aug. 1	Oats*, barley*	2 lbs.	3 bu.
June-July	June-July	Not. rec.	Sudangrass	1 lb.	30-40 lbs.
Aug. 1 to Oct. 15	Aug. 1 to Oct. 10	Aug. 1 to Oct. 1	Rye*	3 lbs.	2-3 bu.
Sept. 20 to Oct. 15	Sept. 10 to Oct. 10	Sept. 1 to Oct. 1	Wheat	3 lbs.	2-3 bu.

* Indicates species best suited for wildlife food.

Immediately after seeding, mulch:

- all slopes
- unstable soils, and
- heavy clay soils

with unweathered small grain straw or hay spread uniformly at a rate of 1.5 to 2 tons per acre, or 100 pounds (2-3 bales) per 1,000 square feet. Other suitable materials may be used, according to specifications in the Mulching BMP.

Source: USDA Soil Conservation Service Technical Guide #342

Exhibit 3

Determining Appropriate Seeding Mixture Numbers Based on Site Conditions.

Site	Rough Areas	Steep Areas Ditch Banks Cuts Fills	Utility Rights- of way	Pond Edges ^b	Grassed Waterways Diversions ^b
Well and moderately well drained sand and loamy sand (coarse textured soils)	sunny-1, shady-2 or 4	4 or 6	15	4	4
Well and moderately well drained, moderately coarse to moderately fine textured soils (sand loam, loam, silt loam, and clay loam)	sunny-1, shady-2 or 5	4, 7, 8, 9, or 19	15	11 or 14	11, 13 17, 20
Well and moderately well drained clay and or 5 silty clay (fine texture soils)	sunny-1 shady-2	7, 8, 9, 13 or 19	15	11, 12 or 14	11, 13, 17, 20
Somewhat poorly drained or poorly drained soils without artificial drainage ^a	3 or 5	8, 10, 13 or 16	15	12 or 13	17, 18
Organic soils ^a	3	10, 16 or 18	16	11 or 12	

^a With artificial drainage, use the appropriate site condition in the well-drained groups above.

^b Mixtures one and two can be used on grassed waterways that are to be given care and management as lawn.

Source: USDA Soil Conservation Service Technical Guide #342

Exhibit 4

Seeding Mixtures (in pounds per acre) Corresponding with Seeding Mixture Number

Under the seed mixture number selected in Exhibit 3, use all species shown in that column. For example: for Exhibit 3, seeding no. 6, the correct seeding mixture is 25 lbs. of creeping red fescue plus 5 lbs. of perennial ryegrass and 20 lbs. of tall fescue. These are minimum rates for ideal conditions. Use judgement to increase rates for less than ideal conditions.

Seeds Per Pound	Species	Seed Mixtures From Exhibit 3*																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
615000	Creeping red fescue**	20	30	10	40		25		20						20	20					
227000	Perennial ryegrass	(a)	(a)		(a)		5					5	5			5		5	5		
2177000	Kentucky bluegrass	20	10	25					5						15						
4990000	Redtop**								1							1	1	2	2		
533000	Reed canarygrass**										10						10				
8700000	Seaside bentgrass											1	1	1	1						
136000	Smooth bromegrass**											30		15		10		25			20
227000	Tall fescue					50	20		20	10			40	15		15			30	15	20
1230000	Timothy**							3	2								4				
375000	Birdsroot trefoil (b)**							10	10											10	
110000	Crownvetch (b)**									15											
TOTAL POUNDS		40	40	35	40	50	50	13	58	25	10	36	46	31	36	51	15	32	37	25	40

Seed per square foot at the recommended seeding rate

(a) Five pounds of ryegrass may be added to this mixture on erodible sites or other areas where quick cover is essential

(b) Inoculate all legume seeds with correct inoculant.

* Seeding rates have been rounded off.

** Indicates species best suited for wildlife cover.

Source: USDA Soil Conservation Service Technical Guide #342

Exhibit 5

Appropriate Seeding Mixtures (in pounds/sq. ft.) Corresponding with Seeding Mixture Number

Under the seed mixture number selected in Exhibit 3, use all species shown in that column. For example, for Exhibit 3, seeding no. 6, the correct seeding mixture is .6 lbs. of creeping red fescue plus .2 lbs. of perennial ryegrass and .5 lbs. of tall fescue. These are minimum rates for ideal conditions. Use judgement to increase rates for less than ideal conditions.

Seeds Per Pound	Species	Seed Mixture From Exhibit 3*																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
515000	Creeping red fescue**	.5	.7	.3	1.0		.6		.5						.75	.75					
227000	Perennial ryegrass	(a)			(a)		.2					.2	.2			.2		.2	.2		
2177000	Kentucky bluegrass	.5	.3	.6					.2						.4						
4990000	Redtop**								.03						.03	.03	.05	.05			
533000	Reed canarygrass**										.3						.3				
8700000	Seaside bentgrass											.03	.03	.03	.03						
136000	Smooth brome grass**											.7		.4		.3		.6			.5
227000	Tall fescue					1.2	.5		.5	.3			1	.4		.4			.7	.4	.5
1230000	Timothy**							.1	.05								.1				
375000	Birdsroot trefoil ^b **							.3	.3											.3	
110000	Crownvetch ^b **									.4											

^a 0.15 pounds of cereal ryegrass may be added to this mixture on erodible sites or other areas where quick cover is essential.

^b Inoculate all legume seeds with correct inoculant.

*Seeding rates have been rounded off.

**Indicates species best suited for wildlife cover.

Source: USDA Soil Conservation Service Technical Guide #342